Space Weather Forecast

Issued on Tuesday 17 December 2024 at 13:52 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME in progress, risk of further minor storms on Day 1, then easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low solar activity was observed with only minor Common-class flares. There are currently five sunspot regions on the Earth-facing disc with AR3924 being the most complex sunspot group on the disc. There is a large number of filaments on the visible disc, many of which have started becoming unstable and erupting. The Earth is currently experiencing a CME (Coronal Mass Ejection) thought to be from one of these filament eruptions early on the 15th. Further eruptions were observed during the morning of the 17th but unlikely to be Earth-directed.

Solar Wind / Geomagnetic Activity: The solar wind saw a significant enhancement during the early hours of the 17th from 17/0437UTC as a CME arrived, with speeds increasing from 440 to 700km/s and a strong interplanetary Magnetic Field (IMF) being observed, initially strongly in the southward direction (encourages Geomagnetic Activity) before going mainly north from 17/0730UTC. This resulted in a G2 Minor storm (Kp6) and is now starting to reduce in intensity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate Solar activity is forecast with a chance of M-class flares, increasing slightly from Day 2 (18 Dec) onwards.

Solar Wind / Geomagnetic Activity: The CME currently being experienced at Earth is likely to wane after Day 1 (17 Dec), with isolated G1 Minor storms possible until it does, then, leading to a reduction back to Quiet to Unsettled (Kp1-3) conditions. Several other CMEs that left the Sun in the past few days are forecast as near misses, but cannot be completely ruled out as flanking arrivals at Earth, so there is some uncertainty in the forecast currently.

Energetic Particles / Solar Radiation: There is a daily, slight chance of S1/Minor solar radiation storms or greater, in response to any notable solar flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	40	10	10
Strong	G3	No	20	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	30	50	60	60
Very Active	R3-R5 (X Class)	No	1	5	5	5

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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